

University of Groningen

## Case assignment by prepositions in Russian aphasia

Trofimova, Maria

**IMPORTANT NOTE:** You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

*Document Version*

Publisher's PDF, also known as Version of record

*Publication date:*

2009

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Trofimova, M. (2009). *Case assignment by prepositions in Russian aphasia*. [Thesis fully internal (DIV), Rijksuniversiteit Groningen]. s.n.

### Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

### Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

## CHAPTER VIII

### SUMMARY, COROLLARY AND PERSPECTIVE

This chapter summarizes the results of all the experiments administered within the framework of this thesis, and discusses the findings thereof in the light of the previous research outlined in the preceding chapters. Possible perspectives for future research are also proposed here. The main aim of this thesis was to describe the linguistic abilities of Russian aphasic speakers in case assignment by prepositions. The research described here consisted of several experiments designed to continuously assess these abilities of aphasic speakers from different angles.

#### *Summary of the experiments*

As a preamble to the main experiments, an explorative pilot study was performed. The main objective of this study was to examine the general abilities of aphasic speakers to comprehend and produce simple basic prepositions, and to look into the possibility and feasibility of performing the main experiments with them. The results of the pilot experiments showed that production of locative prepositions denoting spatial relationships was difficult for both groups of aphasic speakers, fluent and non-fluent. Comprehension of prepositions and the spatial relationships denoted by these prepositions were found to be less problematic than production for both groups, although both modalities were significantly impaired in comparison with the control speakers. Given the results of these experiments, it was decided that although the abilities of the aphasic speakers were found to be impaired, they could be subject to further research.

The research of prepositions was further pursued in the following ways. First, prepositions were examined in the narrative speech of aphasic speakers. As expected, the non-fluent aphasic speakers experienced difficulties in production of prepositions, which

were reflected in a significantly smaller number of prepositions in their narrative speech in comparison with the neurologically intact control speakers. This was not observed in the data of the fluent aphasic speakers.

Consequently, the non-fluent aphasic speakers were also found to produce significantly fewer correct complete prepositional phrases consisting of a preposition and its complement noun with correct case-marking morphemes. With regard to case assignment and case-marking abilities, when both groups of aphasic speakers produced a preposition in their narrative speech they were more likely to produce correct case-marking morphemes of its complement noun.

Since language deficits of aphasic speakers are known to be manifested to a different degree in experimental conditions and in narrative/spontaneous speech (Bastiaanse, 1995; Caplan, et al., 2006; Lehečková, 2001), in the following experiment, the abilities of aphasic speakers in the production of prepositions and the case-marking morphemes of their complement nouns were further examined in a sentence completion experiment. The results of the sentence completion experiment were in line with the findings of earlier studies, which reported that production of free and bound grammatical morphemes is difficult for aphasic speakers (Beyn et al., 1979; Leikin, 1996; Lehečková, 2001; Tesak & Hummer, 1994; Tsvetkova & Glozman, 1975). Both groups of aphasic speakers experienced difficulties in the production of prepositions; they produced significantly fewer complete correct prepositional phrases than the group of control speakers. Furthermore, the results for the non-fluent aphasic speakers supported the findings of a previous study of case assignment by verbs in Russian aphasia (Ruigendijk, 2002). When the non-fluent aphasic speakers were able to produce correct prepositions, they were also able to produce their complement nouns with correct case-marking morphemes. Moreover, the analysis of control sentences with verb phrases in the sentence completion experiment replicated these findings. These results have proven that the presence of a correct case-assigning preposition facilitates case marking and leads to the production of correct case-marking morphemes of complement nouns. Although none of the studies specifically dealt with an experimental design to study prepositions and case-marking morphemes of their complement nouns, some observations have been made. The fluent aphasic speakers were observed to have a tendency to substitute

prepositions, and to produce the case-marking morphemes appropriate for these prepositions (Beyn et al., 1979). In the sentence completion experiment similar results were obtained. When the fluent aphasic speakers substituted prepositions they produced case-marking morphemes in accordance with these prepositions. However, none of the performance patterns was found to be group specific. Both groups of aphasic speakers showed similar performances. This phenomenon has been observed before (Bastiaanse & Edwards, 2004; Edwards, 2002; Edwards & Bastiaanse, 1998), and was explained by the general difficulties of aphasic speakers in the integration of “lexical-semantic and grammatical processes at sentence level” (Bastiaanse & Edwards, 2004: 101).

In the last experiment of the study, it was investigated whether performance patterns in the production of prepositions and in the production of case-marking morphemes of their complement nouns are similar for prepositions performing a lexical function and for prepositions performing a subcategorized function. Prepositions in a lexical function conveyed semantic concepts, such as place or location, for example. Prepositions in a subcategorized function were used in verb collocations, where they formed one lexical unit in combination with the verb. From earlier studies, prepositions are known to be liable to differential impairment in aphasia, which was claimed to be predetermined either by the context or/and by the function of a particular preposition, and have been found cross-linguistically (Friederici, 1981, 1982; Friederici et al., 1982; Friederici, 1985; Bennis et al., 1983; Grodzinsky, 1988). The prepositional phrases insertion experiment initially examined whether a similar dissociation of two types of prepositions can be found in Russian aphasia. Subsequently, it was examined whether the function of a preposition is related to the case assignment of its complement noun and has influence on the production of correct case-marking morphemes of this noun.

The fluent and the non-fluent aphasic speakers produced significantly fewer correct responses with prepositions in both functions as compared to the control speakers. They were found to be impaired in the production of prepositions performing both lexical and subcategorized functions. Both groups of aphasic speakers performed better on stimuli with prepositions in a lexical function, as compared to prepositions in a subcategorized function. These results suggest corroboration for a differential impairment of prepositions in aphasia, although not across the types of aphasia. With respect to

production of case-marking morphemes of complement nouns, it was found that when the fluent and non-fluent aphasic speakers produced prepositions, they always produced the complement nouns with case-marking morphemes irrespective of the functions of the prepositions. Moreover, in the presence of correctly produced prepositions in either function, the fluent and non-fluent aphasic speakers were more likely to produce correct case-marking morphemes of the complement nouns. And when both groups of aphasic speakers substituted prepositions in either lexical or subcategorized functions, they produced case-marking morphemes of the complement nouns adjusted in accordance with the preposition. These results show that the performance of aphasic speakers on production of case-marking morphemes is not influenced by the function of a preposition.

### *Corollary*

The results of the present study have shown that in comparison to the neurologically intact Russian speakers, both groups of Russian aphasic speakers are impaired in production of prepositions as well as in production of complete correct prepositional phrases.

As outlined in chapter I, several hypotheses and theories have been proposed to account for the performance of non-fluent aphasic speakers. In the 1970s, one theory suggested that the deficit in non-fluent aphasia should be considered as a “purely phonological impairment” (Kean, 1977: 10), which results in omissions of those elements that do not bear stress or do not play a role in the stress pattern of a sentence. In relation to Russian, it was suggested that due to phonological impairment, Russian non-fluent aphasic speakers would delete all overt morphological endings of words and produce sentences consisting of the nominative singular forms of masculine nouns (Kean, 1977). The author states that “in Russian by a productive process a stem may be inflected as either a noun or a verb” (Kean, 1977: 34). The results of the narrative speech analysis, and of the experiments conducted in the framework of this thesis, did not support this claim; moreover, the claim was refuted. Russian aphasic speakers did not delete morphological endings of nouns and therefore did not produce bare noun stems either in

their narrative speech samples or in their performance in experimental conditions. Complement nouns of case-assigning prepositions were always produced with case-marking morphology, even if it was occasionally faulty, and even when these prepositions were produced incorrectly and substituted by others, or omitted from the responses of the aphasic speakers. The data presented here are in line with the results of the afore-mentioned studies on the functional morphology of nouns, and case-morphology in particular, and support the proposition accepted cross-linguistically (Avrutin, 2001; Jarema & Kehayia, 2001; Kehayia et al., 1990; Kertesz & Osmán-Sági, 2001; MacWhinney & Osmán-Sági, 1991; Lehečková, 1988; Miceli et al., 1984; Ulatowska et al., 2001), namely, that distribution of omissions and substitutions of bound grammatical morphemes in aphasia is language specific. Non-fluent (Broca's) aphasic speakers have been reported to omit functional morphemes only if these are not an obligatory part of a word; when these morphemes form an obligatory part of a word, the errors that non-fluent aphasic speakers make are more likely to be substitutions. Production of bare noun stems in Russian results in the production of non-words, since case-morphology is an obligatory part of a word.

The Competition model proposed within the morphological account attributed the problems of agrammatic aphasic speakers to the underlying morphological deficit (Bates & MacWhinney, 1987; Bates, Wulfeck, & MacWhinney, 1991; Devescovi & Wulfeck, 2001). According to this theory, elements that are higher in cue validity, and therefore also high in applicability and reliability, should be better retained in the speech of non-fluent aphasic speakers, and elements that are high in cue cost and require a substantial amount of processing may be impaired (MacWhinney, Bate, & Kliegl, 1984). Within this model, the Russian case-marking system can be regarded both as high in cue validity and high in cue cost. As discussed in chapter II, the main function of the Russian case-marking system is to mark the relationship between the sentence constituents. Because the system is extremely rich and vast it is, on the one hand, reliable and only exceptionally will rare case-marking morphemes be ambiguous in a sentence; therefore, it is high in cue validity. On the other hand, it also requires a substantial amount of processing, which means that it is also high in cue cost. This conflict is difficult to explain in terms of the predictions of the Completion model.

The results of the earlier studies undertaken on a number of languages have also shown that morphology as such is not impaired in agrammatic aphasia, and it does not suffer as long as no syntactic operation is involved. It has been suggested that so-called “syntax dependent morphology” is affected in agrammatism, while other morphemes are preserved; therefore, non-fluent aphasic speakers are able to deal with inflectional morphology fairly successfully when it depends substantially on lexical information and is only partially determined by syntactic information (De Bleser et al., 1996). This statement has been supported by a number of afore-mentioned findings in German (Bayer et al., 1987; De Bleser et al., 1996; De Bleser & Bayer, 1988; Ruigendijk, 2002), Italian (De Bleser & Luzzatti, 1994; Luzzatti & De Bleser, 1996), Dutch (Bastiaanse et al., 2003; Ruigendijk et al., 1999; Ruigendijk, 2002), Hebrew (Ruigendijk, 2002; Ruigendijk & Friedmann, 2008) and in Russian (Ruigendijk, 2002). Specifically with respect to case, the Preserved Case Hypothesis was developed, according to which “morphemes that depend on case and case assignment are NOT directly impaired in agrammatism. Impaired production of case and case-related elements in a sentence is a by-product of an impairment in related syntactic domain” (Ruigendijk & Friedmann, 2008: 952). The results of the narrative speech analysis and of the experiments conducted in the framework of the present thesis are also in line with these findings. Russian non-fluent aphasic speakers showed that they are able to produce case-marking morphemes of complement nouns of prepositions when these prepositions are present in their speech output. Moreover, the presence of correct case-assigning prepositions was found to help in the case assignment of their complement nouns and to lead to production of correct case-marking morphemes. However, given the results of the present study, it cannot be claimed that this finding is unique for non-fluent aphasic speakers only. It also involves Russian fluent aphasic speakers, who showed similar performance patterns. Although the linguistic characteristics of fluent and non-fluent aphasia differ, they also manifest some similarities, since an aphasic syndrome hardly ever occurs in its pure form. With Russian fluent and non-fluent aphasic speakers, although they showed some features characteristic of their syndromes (such as a smaller number of prepositions produced in the narrative speech of non-fluent aphasic speakers than in the narrative speech of neurologically intact speakers, and equal numbers of prepositions in a speech sample from fluent and

neurologically intact speakers) they also displayed certain similarities. Both groups of aphasic speakers proved to be sensitive to relations between sentence constituents, and produced complement nouns of prepositions with correct case-marking morphemes, which are dependent on the realization of these case-assigning prepositions irrespective of the functions these prepositions perform.

### *Perspectives*

*“Ввиду краткости жизни, мы не можем позволить себе роскошь тратить время на задачи, которые не ведут к новым результатам”*

[Considering the life's brevity we cannot afford spending time  
on tasks not leading to the new results]

Lev Landau

In this section, the focus is on areas for possible future research. In trying to answer the specific questions posed in this thesis, other questions and issues have surfaced.

The analysis of the data obtained in the pilot study revealed an interesting observation. In both groups of aphasic speakers choices of reversed roles of objects (in the comprehension experiment), or production of responses with reversed roles of objects (in the production experiment) occurred frequently. It was supposed that this preference could have been caused by the difficulties in assignment of referent-relatum roles to objects. As discussed in chapter IV, it has been suggested that the neurologically intact speakers have specific preferences when they are required to locate one object in relation to another (Levelt, 1996). Preferences of aphasic speakers in this respect have not yet been investigated. It is not clear whether the aphasiological syndromes influence the patterns of assignment of referent-relatum roles to objects, and whether the diverse aphasiological syndromes lead to different strategies and patterns in role assignment. This



issue can be subject to a more profound and further elaborated research, the results of which might add to the general picture of aphasia and its main syndromes.

Moreover, the experiments of the pilot study highlighted another issue. The pilot study investigated the abilities of Russian aphasic speakers with respect to simple basic locative prepositions. However, prepositions are polysemantic, and one and the same preposition can encode several meanings, depending on its linguistic context. Locative meanings of prepositions that relate to space are regarded as their core meanings, as opposed to many other meanings, which are supposedly derived by metaphor (Kemmerer, 2005; O'Keefe, 1996; van Schooneveld, 1978). Two meanings of prepositions, namely locative and temporal, have been claimed to be closely related. In historical linguistic investigations, it has been claimed that the locative meanings of prepositions are always chronologically primary and develop first, and temporal meanings only emerge afterwards (Kemmerer, 2005). Furthermore, evidence for a primary meaning of prepositions as locative comes from child language research. Locative meanings of prepositions were observed to be acquired before their temporal meanings (Clark, 1973; Slobin, 1986). All this evidence taken together denotes that the two meanings of prepositions are indeed closely related. Therefore, it would be interesting to examine whether several meanings of Russian prepositions can be independently impaired in aphasia, and whether this impairment varies across aphasia types. Similar research has been conducted on English prepositions and it has been investigated there whether the temporal and locative meanings of English prepositions can be dissociated from each other as the result of a brain injury (Kemmerer, 2005).

The sentence completion experiment investigated the abilities of Russian fluent and non-fluent aphasic speakers in the production of correct case-marking morphemes in case assignment by prepositions. It was found that as long as the aphasic speakers were able to produce correct case-assigning prepositions they also managed to produce correct case-marking morphemes of the complement nouns of these prepositions. With respect to this experiment two issues arose.

First, in several earlier studies the abilities of non-fluent (Broca's) aphasic speakers were investigated with respect to another property of a noun – gender (Bastiaanse et al., 2003; Bayer, De Bleser & Dronsek, 1987; De Bleser & Bayer, 1988;

De Bleser et al., 1996; De Bleser & Luzzatti, 1994; Luzzatti & De Bleser, 1996). Gender – a lexical property of nouns – was found to be relatively undisturbed in the speech of Broca’s aphasic speakers, while case – a syntactic property – was more problematic. In Russian, a noun is marked for such properties as case, gender and number, which are all encoded morphologically. Therefore, to get a better understanding of aphasia, and to obtain more information about the aphasic syndromes cross-linguistically, similar research conducted on morphologically rich agglutinating languages, such as Russian, would be beneficial. Previously in Russian, sensitivity to grammatical gender has been investigated. It was proposed that in Russian aphasia, gender knowledge is spared; however, the processing of gender is deviant (Akhutina et al., 2001), but properties of a Russian noun such as case and gender have not yet been disentangled. It would be interesting to see whether the performance patterns of aphasic speakers found in German and Italian can be replicated in Russian, and if not, what the specific difficulties of Russian aphasic speakers might be in this respect.

Second, the results of the sentence completion experiment showed that when Russian aphasic speakers produced correct case-assigning prepositions, they were able to produce correctly case-marked complement nouns of these prepositions. This proved the statement that morphology in non-fluent aphasia is relatively preserved, and it does not suffer in aphasic production as long as no syntactic relationships are involved. To provide more support for this statement, it would be worth investigating case marking when it is not realized as a bound morpheme, as happens in Russian nouns, but when casemarking is realized in a word form. For example, Russian personal pronouns constitute a very specific word-class. One of their main characteristics is ‘stem suppletion’, which is similar to English irregular verbs (“went” is the suppletive past form of the verb “to go”). In Russian, a form of a personal pronoun in the nominative case is always opposed to its other case-forms; for example, *Ja*: “I, nom.case”, *menja*: “me, gen.case”, *mne*: “me, dat.case”. This property of Russian personal pronouns is dissimilar to Russian nouns, which do not change their stem within the case-paradigm; the only change occurs across case-marking inflections. Therefore, with respect to Russian personal pronouns it was claimed that “it is either impossible or it is very difficult to discern a stem and an

inflection” (Peshkovsky, 1923: 173)<sup>31</sup>. Examination of the case-marking abilities of aphasic speakers with respect to personal pronouns may add more to the investigation of case and its co-current phenomena.

In the last experiment of this thesis, two types of prepositions were investigated, namely, prepositions performing a lexical function and prepositions performing a subcategorized function. In this experiment another interesting question surfaced, although it was not the focus of the investigation. Prepositions in a subcategorized function were used in verb collocations, where they formed one lexical unit in combination with the verb. As we have seen, Russian is a fusional or inflecting language, with very rich morphology, both inflectional and derivational in verbal and nominal categories; for example, in verbal categories the usage of prefixes is frequent, each of which adds additional semantic content to a verb, which cannot always be fully and adequately interpreted in other languages. For example, a verb *pisat'*: “to write” in combination with prefixes *o-*, *s-*, *za-*, *is-*, *na-*, *ot-*, *po-*, *vy-*, and *pere-* produces up to nine other verbs with diverse meanings; for example, *pisat'*: “to write”; *o-pisat'*: “to describe”; *ot-pisat'*: “to sign away”, *vy-pisat'*: “to discharge”; *pere-pisat'*: “to rewrite”. In some verb collocations, the verb prefix and the preposition used after the verb can duplicate each other; for example, a prefix *s-* and a preposition *s*: “from” *sprygnut' s divana*: “to jump from the sofa”; a prefix *ot-* and a preposition *ot*: “from” *ottojti ot doma*: “to walk away from home”; a prefix *do-* and a preposition *do*: “up to, until” *dojti do vokzala*: “to approach the station”. This property of Russian verbs allows for the examination of whether aphasic speakers are sensitive to such morphological cues as verb prefixes in production of prepositions, and whether verb prefixes can improve production of “duplicating” prepositions (*sprygnut' s divana*: “to jump from the sofa”), when compared to simple prepositions (*prygnut' na divan*: “to jump on the sofa”).

---

<sup>31</sup> The original text from Peshkovsky (1923: 173): “или совсем нельзя, или весьма трудно различить основу и окончание”.